Virginia

Standards of Learning Assessments

Test Blueprint

Geometry

2016 Mathematics Standards of Learning

This revised test blueprint will be effective with the administration of the 2018-2019 Mathematics Standards of Learning (SOL) tests.

Notice to Reader

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Standards of Learning

Test Blueprint

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General Test Information

Test Blueprint
Much like the blueprint for a building, a test blueprint serves as a guide for test construction. The blueprint indicates the content areas that will be addressed by the test and the number of items that will be included by content area and for the test as a whole. There is a blueprint for each test (e.g., grade 3 reading, grade 5 mathematics, grade 8 science, Virginia and United States History).

Reporting Categories
Each test covers a number of Standards of Learning (SOL). In the test blueprint, the SOL are grouped into categories that address related content and skills. These categories are labeled as reporting categories. For example, a reporting category for the Geometry Standards of Learning test is *Polygons, Circles, and Three-Dimensional Figures*. Each of the SOL in this reporting category addresses properties, measurement, or applications of polygons, circles, and three-dimensional figures. When the results of the SOL tests are reported, the scores will be presented for each reporting category and as a total test score.

Assignment of Standards of Learning to Reporting Category
In the Geometry SOL test, each SOL is assigned to only one reporting category. For example, SOL G.1a-c is assigned to "Reasoning, Lines, and Transformations."

Coverage of Standards of Learning
Due to the large number of SOL in each grade level content area, *every* Standard of Learning will not be assessed on every version (form) of an SOL test. By necessity, to keep the length of a test reasonable, each version will sample from the SOL within a reporting category. Every SOL in the blueprint will be tested within a three year period, and *all of these* SOL are eligible for inclusion on each version of an SOL test.

Use of the Curriculum Framework
The Geometry Standards of Learning, amplified by the Curriculum Framework, define the essential understandings, knowledge, and skills that are measured by the Standards of Learning tests. The Curriculum Framework asks essential questions, identifies essential understandings, defines essential content knowledge, and describes essential skills students need to master.

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Geometry
Test Blueprint Summary Table

Reporting Category	Geometry SOL	Number of Items
Reasoning, Lines, and Transformations	**G.1a-c** **G.2a-b** **G.3a-d** **G.4a-h**	**16**
Triangles	**G.5a-d** **G.6** **G.7** **G.8a-c**	**13**
Polygons, Circles, and Three-Dimensional Figures	**G.9** **G.10a-c** **G.11a-d** **G.12** **G.13** **G.14a-d**	**16**
Number of Operational Items		**45**
Number of Field-Test Items*		**10**
Total Number of Items on Test		**55**

*Field-test items are being tried out with students for potential use on subsequent tests
 and will not be used to compute students' scores on the test.

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Geometry
Expanded Test Blueprint

Reporting Category: Reasoning, Lines, and Transformations
Number of Items: 16
Standards of Learning:

G.1   The student will use deductive reasoning to construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include
     a) identifying the converse, inverse, and contrapositive of a conditional statement;
     b) translating a short verbal argument into symbolic form; and
     c) determining the validity of a logical argument.

G.2   The student will use the relationships between angles formed by two lines intersected by a transversal to
     a) prove two or more lines are parallel; and
     b) solve problems, including practical problems, involving angles formed when parallel lines are intersected by a transversal.

G.3   The student will solve problems involving symmetry and transformation. This will include
     a) investigating and using formulas for determining distance, midpoint, and slope;
     b) applying slope to verify and determine whether lines are parallel or perpendicular;
     c) investigating symmetry and determining whether a figure is symmetric with respect to a line or a point; and
     d) determining whether a figure has been translated, reflected, rotated, or dilated, using coordinate methods.

G.4   The student will construct and justify the constructions of
     a) a line segment congruent to a given line segment;
     b) the perpendicular bisector of a line segment;
     c) a perpendicular to a given line from a point not on the line;
     d) a perpendicular to a given line at a given point on the line;
     e) the bisector of a given angle,
     f) an angle congruent to a given angle;
     g) a line parallel to a given line through a point not on the line; and
     h) an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

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Reporting Category: Triangles
Number of Items: 13
Standards of Learning:

G.5   The student, given information concerning the lengths of sides and/or measures of angles in triangles, will solve problems, including practical problems. This will include
        a) ordering the sides by length, given angle measures;
        b) ordering the angles by degree measure, given side lengths;
        c) determining whether a triangle exists; and
        d) determining the range in which the length of the third side must lie.

G.6   The student, given information in the form of a figure or statement, will prove two triangles are congruent.

G.7   The student, given information in the form of a figure or statement, will prove two triangles are similar.

G.8   The student will solve problems, including practical problems, involving right triangles. This will include applying
        a) the Pythagorean Theorem and its converse;
        b) properties of special right triangles; and
        c) trigonometric ratios.

Reporting Category: Polygons, Circles, and Three-Dimensional Figures
Number of Items: 16
Standards of Learning:

G.9   The student will verify and use properties of quadrilaterals to solve problems, including practical problems.

G.10   The student will solve problems, including practical problems, involving angles of convex polygons. This will include determining the
        a) sum of the interior and/or exterior angles;
        b) measure of an interior and/or exterior angle; and
        c) number of sides of a regular polygon.

G.11   The student will solve problems, including practical problems, by applying properties of circles. This will include determining
        a) angle measures formed by intersecting chords, secants, and/or tangents;
        b) lengths of segments formed by intersecting chords, secants, and/or tangents;
        c) arc length; and
        d) area of a sector.

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G.12   The student will solve problems involving equations of circles.

G.13   The student will use surface area and volume of three-dimensional objects to solve practical problems.

G.14   The student will apply the concepts of similarity to two- or three-dimensional geometric figures. This will include
   a) comparing ratios between lengths, perimeters, areas, and volumes of similar figures;
   b) determining how changes in one or more dimensions of a figure affect area and/or volume of the figure;
   c) determining how changes in area and/or volume of a figure affect one or more dimensions of the figure; and
   d) solving problems, including practical problems, about similar geometric figures.

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